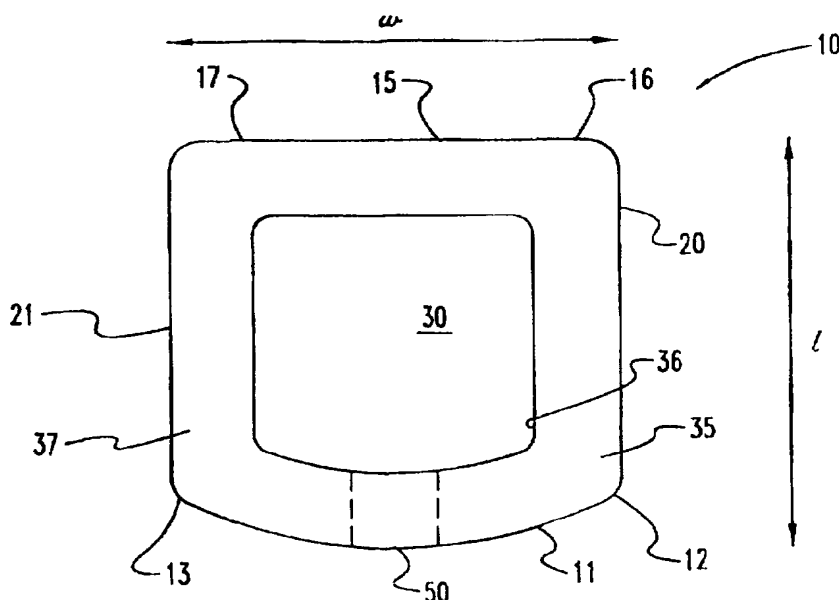




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/US96/16086 (22) International Filing Date: 8 October 1996 (08.10.96) (30) Priority Data: 08/543,563 16 October 1995 (16.10.95) US 08/603,676 20 February 1996 (20.02.96) US (71) Applicant: DANEK MEDICAL, INC. [US/US]; 1800 Pyramid Place, Memphis, TN 38132 (US). (72) Inventors: VAN HOECK, James; 754 Tealwood Lane, Cordova, TN 38018 (US). McDONALD, Troy; 3939 Meade Lake Road, Millington, TN 38053 (US). COATES, Bradley, J.; 1760 Nuckolls Road, Rossville, TN 38066 (US). HAID, Regis, W., Jr.; 2995 Devonshire Place, Atlanta, GA 30327 (US). HEIM, Stephen, E.; 1305 Carlton, Wheaton, IL 60187 (US). FOLEY, Kevin; 2877 Keasler Circle W., Germantown, TN 38139 (US). ECKSTEIN, Eugene, C.; 2330 Kempton Drive, Germantown, TN 38139 (US). (74) Agents: KNOLL, Deborah, R. et al.; Woodard, Emhardt, Naughton, Moriarty & McNett, Bank One Center/Tower, Suite 3700, 111 Monument Circle, Indianapolis, IN 46204 (US).		(81) Designated States: AL, AU, BA, BB, BG, BR, CA, CN, CU, CZ, EE, GE, HU, IL, IS, JP, KP, KR, LC, LK, LR, LT, LV, MG, MK, MN, MX, NO, NZ, PL, RO, RU, SG, SI, SK, TR, TT, UA, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> (88) Date of publication of the international search report: 7 August 1997 (07.08.97)	

(54) Title: INTERVERTEBRAL SPACERS



(57) Abstract

One embodiment of a hollow spinal spacer (10) includes a curved anterior wall (11) having opposite ends (12, 13), a posterior wall (15) having opposite ends (16, 17), two lateral walls (20, 21), each integrally connected between the opposite ends (12, 13, 16, 17) of the anterior (11) and posterior (15) walls to define a chamber (30). The walls (11, 15, 20, 21) include a superior face (35) and an inferior face (40). The superior face (35) defines a first opening (36) in communication with the chamber (30) and includes a first vertebral engaging surface (37). The inferior face (40) defines a second opening (41) in communication with the chamber (30) and includes a second vertebral engaging surface (42).

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INTERNATIONAL SEARCH REPORT

Inter national Application No
PCT/US 96/16086

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A61F2/44

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 A61F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	WO 95 08306 A (SYNTHES AG) 30 March 1995 see page 8, line 22 - page 10, line 3 see page 4, line 4 - line 5 see claim 40 see figures 3,4,16 ---	1-5 6-14, 17-20,22
Y	WO 94 26893 A (GENETICS INSTITUTE, INC.) 24 November 1994 cited in the application see page 1, line 16 - line 28 see page 13, line 2 - line 20 ---	6-14, 17-20,22
A	FR 2 710 519 A (ROBINE ET AL) 7 April 1995 see abstract; figures ---	1
A	US 5 397 364 A (KOZAK ET AL) 14 March 1995 see the whole document ---	23,36
-/--		

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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- "&" document member of the same patent family

Date of the actual completion of the international search

16 May 1997

Date of mailing of the international search report

26.06.97

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 96/16086

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 834 757 A (BRANTIGAN) 30 May 1989 see column 6, line 40 - column 7, line 26; figures 7,8 ---	42
P,A	WO 95 31947 A (SPINE-TECH, INC.) 30 November 1995 see abstract; figure 2 ---	42
A	WO 94 04100 A (SOFAMOR) 3 March 1994 see page 11, line 12 - line 16; figure 5 ---	49
A	WO 90 00037 A (MICHELSON) 11 January 1990 see page 15, line 32 - page 16, line 20; figures 15-17 -----	49

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 96/ 16086

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. Claims:1-22 A hollow spinal spacer containing material to promote bone growth.
 2. Claims:23-42 A hollow spinal spacer having lateral and anterior surfaces corresponding to the shape of a vertebral end plate.
 3. Claims:42-48 A hollow spinal spacer with lateral wings.
 4. Claims:49-57 A hollow spinal spacer with cutting blades.
1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
 2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
 3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
 4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

information on patent family members

International Application No

PCT/US 96/16086

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9508306 A	30-03-95	BE 1007549 A CA 2151481 A EP 0670702 A JP 8503876 T	01-08-95 30-03-95 13-09-95 30-04-96
WO 9426893 A	24-11-94	AU 6910794 A BR 9406716 A EP 0698095 A FI 955420 A JP 9501305 T NO 954525 A	12-12-94 06-02-96 28-02-96 08-01-96 10-02-97 09-11-95
FR 2710519 A	07-04-95	NONE	
US 5397364 A	14-03-95	AU 7921794 A CA 2172638 A CN 1137232 A EP 0725607 A WO 9510248 A ZA 9407959 A	04-05-95 20-04-95 04-12-96 14-08-96 20-04-95 22-05-95
US 4834757 A	30-05-89	US 4743256 A AU 614609 B AU 3436389 A DE 3876909 A EP 0307241 A JP 3503133 T WO 8909035 A US 4878915 A	10-05-88 05-09-91 16-10-89 04-02-93 15-03-89 18-07-91 05-10-89 07-11-89
WO 9531947 A	30-11-95	AU 1841095 A CA 2191089 A EP 0760639 A US 5609636 A	18-12-95 30-11-95 12-03-97 11-03-97
WO 9404100 A	03-03-94	FR 2694882 A AU 4964593 A CN 1090485 A ZA 9306156 A	25-02-94 15-03-94 10-08-94 19-09-94

INTERNATIONAL SEARCH REPORT

Information on patent family members

Inter nal Application No

PCT/US 96/16086

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9000037 A	11-01-90	AT 119015 T	15-03-95
		AU 3965489 A	23-01-90
		CA 1333209 A	29-11-94
		CA 1337842 A	02-01-96
		DE 68921482 D	06-04-95
		DE 68921482 T	20-07-95
		EP 0425542 A	08-05-91
		EP 0734702 A	02-10-96
		EP 0637439 A	08-02-95
		JP 3505416 T	28-11-91
		US 5609635 A	11-03-97
		US 5522899 A	04-06-96
